

20



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/649,779	08/28/2003	Sang-chul Shin	1293.1961	5852
21171	7590	03/08/2005	EXAMINER	
STAAS & HALSEY LLP SUITE 700 1201 NEW YORK AVENUE, N.W. WASHINGTON, DC 20005			HABERMEHL, JAMES LEE	
			ART UNIT	PAPER NUMBER
			2651	

DATE MAILED: 03/08/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/649,779	Applicant(s) SHIN, SANG-CHUL	
	Examiner James L Habermehl	Art Unit 2651	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 August 2003 and 24 September 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 5-8, 14-17 and 22-26 is/are allowed.
- 6) ☒ Claim(s) 1-3, 9-11 and 18-20 is/are rejected.
- 7) ☒ Claim(s) 4, 12, 13 and 21 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>28 Aug 03 and 24 S.</u> | 6) <input type="checkbox"/> Other: _____ |

Art Unit: 2651

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.
2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 9, and 18 are rejected under 35 U.S.C. 102(b) as being anticipated by IBM TDB Vol. 39, No. 11, pp. 181-182, henceforth known as "IBM." IBM meets all the limitations of method claim 1, including detecting a voltage applied to a voice coil ("monitoring the VCM voltage") during a predetermined mode ("powered off"), performing an operation of the value of the counter-electromotive force using the voice coil voltage ("(2) shocks can be detected by monitoring the VCM voltage (back-emf) which results from any actuator motion"), comparing the value of the counter-electromotive force operated with a predetermined threshold ("A comparator may be used to detect when the VCM voltage crosses a threshold"), when the value of the counter-electromotive force is equal to or larger than the predetermined threshold, controlling a voice coil motor and a spindle motor so that a current mode is stopped and a parking or unloading mode is executed ("which activates the retract system").

Regarding claim 9, IBM meets all the limitations for similar reasons as above, and also shows a disk, transducer, voice coil motor, and a spindle motor to rotate the disk (inherently so in order to render the disk drive functional).

Computer readable storage (medium) claim 18 is drawn to storing the method of corresponding method claim 1 on a computer readable storage (medium). Claim 18 has limitations similar to those treated in the above rejection of method claim 1, and they are met by the reference as discussed above. Therefore claim 18 is rejected for the same reasons of anticipation as used above to reject claim 1.

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-3, 9-11, and 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uchiike et al. in view of Patton et al. Uchiike et al. Figures 1, 3, and 6 show a disc having a surface, a spindle motor, a read/write transducer with VCM, and detecting a shock event during a predetermined mode (loading the head) and controlling a voice coil motor and a spindle motor so that a current mode is stopped and a parking or unloading mode is executed (steps S3/S5/S6). Uchiike et al. does not show the claimed limitations drawn to using the counter-electromotive force in the voice coil for detecting the shock.

Patton et al. Figure 3 shows, in the analogous art of shock detection while in a predetermined disk drive mode, detecting a voltage applied to a voice coil (col. 6, lines 54-62) during a predetermined mode (col. 6, lines 62-66), performing an operation of the value of the counter-electromotive force using the voice coil voltage (element 36), comparing the value of the

Art Unit: 2651

counter-electromotive force operated with a predetermined threshold (element 39), when the value of the counter-electromotive force is equal to or larger than the predetermined threshold, controlling a voice coil motor (element SHK) for the purpose of determining the rotational component of a shock-caused motion using a system that requires minimal, if any, additional space within a disk drive housing. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of Uchiike et al. to enable use of the disclosure of Patton et al. of detecting voice coil BEMF, compare the value to a threshold, and use it when controlling a voice coil motor so that a current mode is stopped and an unloading mode is executed, the motivation being determining the rotational component of a shock-caused motion using a system that requires minimal, if any, additional space within a disk drive housing.

Regarding claims 2, 10, and 19 the counter-electromotive force $e(t)$ is obtained by the disclosed combination at Patton et al. element 36 by $e(t) = v(t) - L \times (di/dt) - R \times i(t)$ as shown for example in col. 10, lines 58-67 and by using -1 unity gain ratios for the $L \times (di/dt)$ and $R \times i(t)$ components feeding the adder 36.

Regarding claim 3, 11, and 20 the predetermined mode is shown in Uchiike et al. to be a loading mode.

Computer readable storage (medium) claim 18 is drawn to storing the method of corresponding method claim 1 on a computer readable storage (medium). Claim 18 has limitations similar to those treated in the above rejection of method claim 1, and they are met by the combination of references as discussed above. Therefore claim 18 is rejected for the same reasons of obviousness as used above to reject claim 1.

Art Unit: 2651

6. Claims 5-8, 14-17, and 22-26 are allowed over the prior art of record. Claims 4, 12-13, and 21 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The following is a statement of reasons for the indication of allowable subject matter:

Claims 4, 12, and 21 are allowable over the prior art of record since the cited references taken individually or in combination fails to particularly disclose a method of controlling a disk drive using counter-electromotive force, a disk drive, and a computer readable storage storing at least one program to control a disk drive using a counter-electromotive force according to a process comprising calculating the predetermined threshold from a regression function corresponding to a statistical correlation between the magnitude of an external shock and the counter-electromotive force, as presented in the environment of claims 4, 12, and 21. It is noted that the closest prior art, Patton et al., shows controlling a disk drive using counter-electromotive force similar to the claimed invention. However, Patton et al. fails to disclose calculating the predetermined threshold from a regression function corresponding to a statistical correlation between the magnitude of an external shock and the counter-electromotive force as claimed.

Claim 13 is allowable over the prior art of record since the cited references taken individually or in combination fails to particularly disclose a method of controlling a disk drive using counter-electromotive force comprising the controller further comprises a circuit to compensate signal delay between a driving signal to drive the voice coil motor and a voltage detection signal from the voice coil, as presented in the environment of claim 13. It is noted that the closest prior art, Patton et al., shows a method of controlling a disk drive using counter-

Art Unit: 2651

electromotive force similar to the claimed invention. However, Patton et al. fails to disclose the controller further comprises a circuit to compensate signal delay between a driving signal to drive the voice coil motor and a voltage detection signal from the voice coil as claimed.

Claims 5, 14, and 22 are allowable over the prior art of record since the cited references taken individually or in combination fails to particularly disclose a method of controlling a disk drive using counter-electromotive force, a disk drive, and a computer readable storage storing at least one program to control a disk drive using a counter-electromotive force according to a process comprising applying the detected moving distance variation of the transducer with respect to the variation in time to a predetermined counter-electromotive force calculation equation, as presented in the environment of claims 5, 14, and 22. It is noted that the closest prior art, Patton et al., shows controlling a disk drive using counter-electromotive force similar to the claimed invention. However, Patton et al. fails to disclose applying the detected moving distance variation of the transducer with respect to the variation in time to a predetermined counter-electromotive force calculation equation as claimed.

Claim 26 is allowable over the prior art of record since the cited references taken individually or in combination fails to particularly disclose a method of controlling a disk drive using counter-electromotive force comprising calculating the counter-electromotive force, determining a magnitude of an external shock or a vibration by the calculated counter-electromotive force, and when the magnitude exceeds a tolerance range, controlling the disk drive into a parking or unloading mode, as presented in the environment of claim 26. It is noted that the closest prior art, Patton et al., shows a method of controlling a disk drive using counter-electromotive force similar to the claimed invention. However, Patton et al. fails to disclose

Art Unit: 2651

calculating the counter-electromotive force, determining a magnitude of an external shock or a vibration by the calculated counter-electromotive force, and when the magnitude exceeds a tolerance range, controlling the disk drive into a parking or unloading mode as claimed.

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Bi et al. Figures 3-4 and 9, Krishnamoorthy et al. Figures 1-2, and Heydt et al. Figures 3-4 are similar to applicant's invention.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to James L Habermehl whose telephone number is (703)305-6975. The examiner can normally be reached on 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Hudspeth can be reached on (703)308-4825. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Habermehl/jlh
26 Feb 05



DAVID HUDSPETH
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600